
**UNIVERSITY OF GONDAR**

**COLLEGE OF AGRICULTURE AND RURAL TRANSFORMATIONDEPARTMENT OF AGRICULTURAL ECONOMICS**

# FACTORS AFFECTING LIVELIHOOD DIVERSIFICATION DECISION IN DABAT WOREDA OF NORTH GONDAR ZONE, ETHIOPIA

**M.SC. THESIS**

**BY**

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**DEPARTMENT OF AGRICULTURAL ECONOMICS**

# FACTORS AFFECTING LIVELIHOOD DIVERSIFICATION DECISIONS: THE CASE OF DABAT WOREDA, AMHARA REGION, ETHIOPIA

**A Thesis Presented to the Department of Agricultural Economics in Partial Fulfillment of the Requirements for the Degree of Master of Science in Agricultural Economics**

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Factors Affecting Livelihood Diversification Decision
In Dabat Woreda of North Gondar Zone, Ethiopia,

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# DEDICATION

I dedicate this thesis manuscript to my friend Ephraim Mitku for his devoted Partnership in the success of my life.

# STATEMENT OF AUTHOR

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# BIOGRAPHICAL SKETCH

The author was born in May 1988 in North Gondar zone, Gondar town. He attended his elementary school education at Gondar town and his secondary school education in Gondar town Fasiledes Secondary School. Then he joined the Debre Markos University in 2008 and graduated in July 2010 with Bsc degree in Rural Development. Soon after graduation, he has been working for six years in Dabat town in various capacities. Then after, he joined the school of graduate studies at University of Gondar in October 2014 to pursue his M.Sc. degree in Agricultural Economics.

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# LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| BLRM | Binary Logistic Regression Model |
| CSA | Central Statistical Agency |
| Das | Development Agents |
| DBA | Dabat Bureau of Agriculture |
| EAFM | Economically active family member |
| FGD | Focus Group Discussion |
| Ha | Hectare |
| HABP | Household Asset Building Program |
| HH | Household Head |
| KI | Key Informant |
| KM | Kilo Meter |
| LAD | Least Absolute Deviation |
| NGZFED | North Gondar Zone Finance and Economic Development |
| NGO | Non-Governmental Organization |
| OLS | Ordinary List Square |
| PIPs | Processes Institutions and Policies |
| PSNP | Productive Safety Net Program |
| RUSSACOs | Rural Saving and Credit organization |
| SHH | Sampled Household Head |
| SHG | Self-Help Group |
| SPSS | Statistical Package for Social Science |

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## *ABSTRACT*

*Factors Affecting Livelihood Diversification Decision in Dabat Woreda Of North Gondar Zone, Ethiopia, Dabat Woreda is one of the 25 woredas in North Gondar zone administration of Amhara Region. The woreda's capital is Dabat which is 255 km North of Bahir Dar city. The livelihood of the rural part of the woreda is mainly based on agriculture. Rural household in the woreda continue to struggle with food insecurity primary cause by extreme drought. In the urban the economic sector is mainly composed of trade, small hotels, shopping, micro small enterprises are major (Dabat Communication Office, 2011).This study was conducted to assess the various factors that affect households' decisions on livelihood diversifications. Data was gathered by household survey from 376 sample households of 8 randomly selected rural kebeles of the District through structural questionnaires. The alternative livelihood strategies that were used by the study households were agriculture only, and agriculture plus other activities (off-farm and non-farm activities). Binary Logit model was employed in identifying the determinants of rural livelihood diversification decision. From 13 hypothesized explanatory variables, 5 variables were found to have significant effect in determining diversification of household livelihood decisions. Accordingly, age of the household head, access to credit, receiving remittance and land size have negative association with livelihood diversification strategy. Whereas, getting training has a positively influence on households choice of livelihood diversification. Therefore, the findings of this imply that rural households' development policies should consider off-farm and non-farm livelihood activities in addition to agriculture.*



***Key words: Livelihood, Diversification, Binary Logit regression, Ethiopia***

# 1. INTRODUCTION

## 1.1. Background of the study

Ethiopia with an estimated population of 82 million of which about 83% are rural population is an agrarian country (CSA, 2009). The agricultural sector plays an important role in the national economy, livelihood and socio-cultural system of the country. The sector supports employment of over 80% of the population and accounts for 45 to 50% of the national Gross Domestic Product (GDP) (Berhanu, 2006). Diversification of income sources, assets, and occupations is the norm for individuals or households in different economies, but for different reasons (Adugna, 2005). Despite the traditional believes that view rural non-farm sector as a low productivity sector, recent years have witnessed a shift away from this position towards a recognition that of the rural non-farm contribution to economic growth, rural employment, poverty reduction (Lanjouw and Lanjouw1995). Ecological and environmental influence due to human developmental activities has been steadily increasing and causing unprecedented magnitude and rate of global ecosystem change. The rural poor have developed the capacity to cope with increasing vulnerability associated with agricultural production -diversification, intensification and migration or moving out of farming (Ellis, 2000).

Diversification of income sources, ownership of assets, and occupations are the norm for individuals or households for different socio-economic reasons. The literature on diversification tends to categorize livelihood sources as either farm or non-farm. The latter is often implicitly being taken to be non-natural resource based activities such as trading, construction, service industries, etc. Households and individuals are motivated for different reasons in diversifying assets ownership and income generating activities ( Berhanu, 2006).

The first set of motives could be in one of the following and usually known as “push factors”: risk reduction, response to diminishing factor returns in any given use, such as family labor supply in the presence of land constraints driven by population pressure and landholdings fragmentation, reaction to crisis or liquidity constraints, high transactions costs that induce households to self-provision in several goods and services, etc. The second set of motives comprise “pull factors”: realization of strategic complementarities between activities, such as crop-livestock integration or milling and hog production, specialization according to comparative

advantage accorded by superior technologies, skills or endowments, etc (Christopher *et al.,* 2001).

Other experts have identified in Sub-Saharan Africa that diversification can be represented as a failure of agriculture as means of providing livelihood for a substantial proportion of rural inhabitants. They express diversification in Africa as an active process of "de-agrarianization" whereby farming becomes a part-time, residual, or fall-back activity and livelihoods become increasingly oriented to non-farm and non-rural activities (Bryceson, 2005).

Non-farm earnings account for a considerable share of farm household income in rural Africa regions. Most of the papers in this special issue confirm widespread reliance on non-farm income sources by African farm households (Reardon, 1997; Reardon *et al*., 1998). According to Barrett *et al*., (2001), in this regard, the logical question is that why do households diversify? Farm household diversification into non-farm activities emerges naturally from diminishing or time-varying returns to labor or land, from market failures (example for credit) or frictions, from risk management, and from coping with adverse shocks. Where returns to productive assets vary across time (land, labor or livestock across dry and wet seasons) or among individuals within a household or households within a community, data aggregated across time, individuals, or households will exhibit diverse assets, activities and incomes even if there is complete specialization according to comparative advantage. Such aggregation likely accounts for a substantial proportion of the diversification reported in empirical studies (Barrett *et al.,* 2001).

Amare and Belaineh, (2013), in Ethiopia at a national, regional and household levels the focus of policy is to increase agricultural productivity and farm income so as to attain food self-sufficiency. Although, substantial resources have been spent on agricultural research and extension to alleviate food shortage in the nation, research and extension activities have not been done adequately on the issues related to off or non-farm employment. In spite of this fact, farmers are engaged in a variety of off and/or non-farm activities to diversify their income with a view to feed and sustain themselves during crop failures. Moreover, the contribution made by livelihood diversification to rural livelihoods is significant and has often been ignored by policy makers who have chosen to focus their activities on agriculture (Ellis, 1998).

Thus, a thorough understanding of alternative livelihood strategies of rural households and communities is indispensable in any attempt to bring improvement. This is important not to

commit a limited resource available for rural development based on untested assumption about the rural poor and its livelihood strategies (Tesfaye, 2003).

## 1.2. Statement of the Problem

A significant number of farm households in sub-Saharan Africa especially in Ethiopia, rely on natural rainfall for their farming activities and are worst affected by changes in weather patterns (Nyambara, 2003). Commonly cited adaptation strategies and measures to improve food security include farm management and technology, diversification on and beyond the farm and government interventions in rural infrastructure (Below *et al*., 2010:5).

Diversification of income sources, assets, and occupations is the norm for individuals or households in different economies, but for different reasons (Adugna, 2005). Dabat woreda is one of the woreda where livelihood diversification has been practiced over time. However, There are numerous factors that determine rural households' ability to diversify their livelihood strategies away from crop and livestock production into off- and non-farm economic activities(DBA,2009). These determinants can be identified both as pre-conditions, namely history, social context and agro-ecology, and the influence of ongoing social change linked with external interventions, such as infrastructural and service provision still observed in the study area. Having these facts as a benchmark, the researcher motivated to undertake research in this area in order to identify the factors affecting livelihood diversification decision. Besides, the factors affecting livelihood diversification are not much researched in the study area.

Off course, many researchers conducted research to see the determinants of rural diversifications Dessalegn Anshiso (2016) in Hadiyya Zone of Southern Ethiopia, Kebede Manjur, Haileselassie Amare, Gebrehiwot Hailemariam and Luchia Ttekle (2014) in Northern Ethiopia, Kejela Gemtessa (2005) in borana pastoral communities of Ethiopia. However, a fairly comprehensive search of literatures showed no research on this particular issue has been conducted in the selected study site so far. As a result of this, it is necessary to assess what livelihood strategies are adopted by farm households and what factors affect farm household decisions' on diversifying livelihood activities to raise their income in particular contextual area of study Woreda.

## 1.3 Objective of the study

### 1.3.1 General Objective

The overall objective of this research is to assess the various factors that affect farmers' decisions on livelihood diversifications.

### 1.3.2 Specific objectives

1.To investigate the common means of livelihood beyond Agriculture (on farm) activities in the study area,

2. To identify the major driving forces why rural households engage in livelihood diversification activities besides farming in the study area.

3. To identify the factors that determine household's decisions in diversified livelihood activities in the study area?

## 1.4. Research Questions

1. What are the common means of livelihood beyond agriculture for rural households in the study area?

2. What are the major driving forces to rural households engage in livelihood diversification activities besides farming in the study area?

3. What are the factors that determine household's decision in diversified livelihood activities in the study area?

## 1.5 Scope and limitation of the Study

The scope of the study is limited to assess the various factors that affect farmers' decisions on livelihood diversifications in Dabat Woreda. Thus, geographically, the scope of the study is rural farm households of the Woreda. However, conceptually the study is limited to identify predominant livelihood diversification strategies used by the farm households and to analyze the major factors influencing the type of livelihood diversifications adopted in the study area

## 1.6 Significance of the study

Since, the general purpose of this study is assessing the various factors that affect farmers' decisions on livelihood diversifications, this study is expected to be informative or useful for all rural development actors on how to effectively assist households in drought prone areas mitigating the effects of droughts and ensure increased food security through diversification of livelihoods. Findings therefore provide useful insights for poverty alleviation programs especially in rural areas of Dabat woreda, where poverty rates are disproportionately high.

It could also provide several of factors causing food insecurity and thus it recommends closer collaboration among community members, development actors and policy makers at all levels. This means efforts to ensure improved food security through strategies such as livelihood diversification requires a mix of other complimenting policies and strategies at national and local levels.

## 1.7 organization of the thesis

This thesis is organized in five chapters. The first chapter describes an outline of the survey which includes the background of the study (introduction), statement of the problem, objectives of the study, research questions, scope and limitation of the study, significance of the study and organization of the thesis. Chapter two comprises a review of the literature. And the third chapter focus on the description of the study are, research approach and methods, research design, data source and data collection, sampling techniques, sample procedure and sample size and data analysis and interpretation. The fourth deal about the study result and discussions. The last and the fifth chapter included conclusion and recommendations.

# 2. LITERATURE REVIEW

## 2.1. Concept and overview of Livelihood Diversification.

The literature on livelihood diversification, which crosses several fields and disciplinary approaches, is characterized by many terms and definitions. Ellis (1998) defined livelihood diversification as a process by which rural households construct a diverse portfolio of activities and social support capabilities in order to maintain or improve their ability to make a living. Here, Ellis recognizes livelihood diversification as no simple income diversification; rather it is a struggle for survival and in order to improve their standards of living. A household may diversify its livelihood due not only to maintain its means of living but also to improve the existing income as this is not sufficient to maintain life in a sustainable manner.

Livelihood diversification refers to attempts by individuals and households to find new ways to raise incomes and reduce environmental risk, which differ sharply by the degree of freedom of choice (to diversify or specialize), and the reversibility of the outcome (Hussein & Nelson, 1998). Livelihood diversification includes both on and off farm activities which are undertaken to generate additional income. It includes the household agricultural and non -agricultural goods and services, wage labor, or self- employment in small firms, and other strategies undertaken to spread risk.

Livelihood diversification includes activity or environment diversification in agriculture (Carter, 1997) and migratory strategies (Stark &Levhari, 1982). Within agriculture, a household prefers to have plots of land in different agro ecology so that a failure of crop in one agro ecology may not devastate his whole life. Among the pastoralists, this type of diversification is present where they keep their livestock in different areas based on the availability of pasture and water.

In another definition, livelihood can be defined as the sum of means by which people get by over time. It refers to the courses that ordinary people pursue to manage risk and vulnerability. Masefield (2001) defines livelihoods as the activities, the assets and the access that jointly determine the living gained by an individual or household. FIFC (2005) has developed livelihood definition more suited to disaster settings, particularly those characterized by conflict. Accordingly, livelihoods are referred to as the ways in which people access and mobilize resources that enable them to pursue goals necessary for their immediate and long term survival.

Livelihood diversification activities are commonly categorized on the basis of their roles as mechanisms for coping, adaptation and accumulation (Carswell,2000). Accordingly, diversification is classified based on the purpose of implementing it. Households may diversify their livelihood to cope with the problem that occurred in the region including drought, disease outbreak, population growth, etc. and households diversify their livelihood to survive hard times. Such type of diversification is mostly practiced by poor households who diversify their livelihood in case of food shortage due to natural and manmade calamities.

On the other hand, there are households who diversify their livelihood to improve their existing income and accumulate more wealth. Therefore, livelihood diversification of poor HH who are struggling to survive and that of better off HHs that are diversifying to accumulate have been observed. Reasons for diversification, activities, the degree of conscious choice exercised by actors and the effects that they have on the household varies in different context (Ellis, 1998). While some diversification activities may be prevalent among the poor HHs struggling for survival (e.g. gathering grass and fire wood), others are prevalent among richer HHs.

Livelihood diversification is not one time activity, rather it is a process overtime determined by different factors. Accordingly, reasons that individuals and households pursue for livelihood diversification are divided in to two overarching considerations, which are necessity and choice (Ellis, 2000). This is also termed as a contrast between survival and choice (Davies, 1996) or between survival and accumulation (Hart, 1994). Necessity refers to involuntarily and distress reasons for diversifying (Ellis, 2000) and examples of such type might be eviction of a tenant family from their access to land, fragmentation of farm holdings on inheritance, environmental deterioration leading to declining crop yield, natural or civil disasters such as drought, floods, etc. On the other hand, choice refers to voluntary and proactive reasons for diversifying (Ellis, 2000). Seeking out seasonal wage earning opportunities, traveling to find work in remote localities, educating children to improve their prospects of obtaining non-farm jobs, saving money to invest in non-farm business such as trading are the commonly cited examples.

## 2.2. Determinants of Livelihood Diversification

The determinants of livelihood diversification can be summarized as existence of assets, institutions and policies drawn by state to improve the life of the society (Ellis, 1999). Assets are

different types of capital that support or lead the diversification process. According to Ellis (2000) there are five types of assets identified as influencing the livelihood diversification of the HH and these are human capital, financial capital, physical capital, natural capital and social capital. Human capital refers to the number of people available for productive processes, as well

as the measure of people's skills, education, experiences and capacity for work and participation in social networks. Financial capital includes the financial resources that people use to achieve their livelihood objectives (Lautze*et al*, 2003). This includes financial resources vital for survival such as savings, credits, and income from regular jobs or emergency cash for work programs. Physical capital encompasses all of the structures, infra-structures and equipment used for production. This includes roads, transport network, availability of markets and others. Natural capital can be thought of the earth's equivalent of goods and services and includes forests, rivers, oceans, grazing lands, etc. Social capital can be thought of as membership in groups or voluntary associations. This mainly supports the HHs during crisis where people turn to social networks for support (Lautze*et al*, 2003) and social coping strategies including borrowing from relatives, communal childcare arrangements, participation in revolving loan in societies, and the use of community based self-help networks.

The other determinant in livelihood diversification is processes, institutions and policies, which are formal and informal. The processes, institutions, and policies (PIPs) enable or hinder livelihood strategies thereby generating or reducing vulnerabilities (Lautze*et al*, 2003). According to Pain and Lautze (2002), these influencing factors play a key role in mediating access to resources shaping the context of vulnerability and setting opportunities or constraints to pursuing various livelihood strategies.

## 2.3. Measurement of Diversification

While measuring diversification, several methods can be applied. Among these includes number of productive activities, percentage of income from various activities in total income and the Theil's diversity index are the major (Crole-Rees, 2002). In the first case, productive activities are disaggregated in to crop production, non-crops, farm or nonfarm and off-farm activities. In the areas, this can be livestock keeping, farming, petty trade, etc.

The second method uses the percentage of income from the various activities in total income. The share of non-livestock income expresses the importance of income generated by non-livestock

activities in the area. This index is simple in its computation and also shows the asset allocation of the HH over different activities. The third method is Theil's diversity index. This is based on the distribution of the system i.e. based on the concept of entropy. Minimum diversity is the practice of a single system over the universe, and maximum diversity is an equal distribution of all enterprises (Crole-Rees, 2002). Accordingly, in the case of income diversification, labour allocation over different activities may be used as the unit of measurement. However, as Zandstra (1992) quoted in Crole-Rees (2002) argued, this measure is more difficult to apply when treating complex production systems. However, in the area HHs labour allocation is over. So the first method i.e. number of productive activities were used to measure the level of diversification.

## 2.4 Empirical studies on farmer's decisions to livelihood diversification

Different studies have been undertaken to identify factors determining livelihood diversification among HHs in rural Africa. Barret*et al*, (2001) studied the effects of policy shocks on observed income diversification pattern in rural Africa. They used multinomial logit to estimate factors that affect HH's response to attractive emerging on farm and non-farm opportunities. In their analysis, they used four choices of livelihood strategies namely "full time farmer", "farmer and farm worker", "farm and skilled nonfarm", and "mixed" strategy as dependent variable. According to their study in Cote d'Ivore, HHs with poor endowments were less able to respond to attractive emerging on farm and non-farm opportunities.

Abdulahi and Crole-Rees (2001) studied determinants of income diversification in rural Mali. This study used empirical model focusing on significant factors other than HH's behavior towards risk in explaining the HH's resource allocation over time. Factors identified were number of adult males and females in the HH, number of children, household size, age and education of HH, land holding, value of equipment owned by the HH, distance to the nearest market and food price variability. According to this study, poorer HHs were found to have fewer opportunities in cash crop production as well as non-crop activities resulting in their less diversified income. Lack of capital is certainly a major reason why poor HHs have less diversified portfolios as 42% of the HHs indicated that lack of access to credit was a major constraint to their participation in the non-cropping sector (Abdulahi & Crole-Rees, 2001). In addition, wealth of HH measured by land holding had a large positive impact on its participation.

The trend in income diversification in peri-urban areas of Tanzania was studied by Lanjouw*et al* (2001). Accordingly, comparison between rural HHs and peri urban HHs was studied on the degree and nature of non-farm diversification. They concluded that non-farm income shares for cities are not unambiguously higher than in rural areas as a whole. In addition, they suggested that education and access to infrastructure are important determinants of non-farm incomes in peri-urban areas. The study also suggested on the gender balance of the diversification and women appear to be poorly placed Vis-a Vis the non-farm sector even after controlling for education, age and other characteristics.

Canagarajah *et al* (2001) studied how the distribution of earnings in rural Ghana and Uganda differs by income type and gender. In addition, they studied determinants of income diversification using OLS regression. Share of non-farm income was taken as dependent variable and sex of HH head, age, dependency ratio and distance to the market were found to be positively related to share of non-farm income in Ghana. The same study also identified determinants of income diversification in Uganda and found that female headed HHs, age, education level were positively related to diversification.

A study by Smith *et al* (2001) in two districts of Uganda showed that men had a greater degree of occupational livelihood diversification than women. The same study identified determinants of livelihood diversification to be associated with history, social context and agro ecology, and the influence of ongoing social change linked with external interventions, such as infrastructural and service provision. According to this study, social capital has much influence on livelihood diversification. Here social capital was referred as the small informal groups or associations which rely upon norms, obligations, reciprocity and trust to survive.

Block & Webb (2001) studied associations among income diversification, household perception of livelihood risks and changes in consumption outcomes across two points in post-famine Ethiopia. Accordingly, they identified that wealthier HHs tended to have more diversified income stream; those who initially had more diversification subsequently experienced a relatively greater increase in both income and calorie intake. In addition, they found that personal perceptions of risks factors guided subsequent diversification decision. As to the determinants of livelihood diversification, they estimated econometric model using Least Absolute Deviation (LAD) or median regression. Share of income from crop production against total income was taken as the dependent variable. Accordingly, total income was negatively related to crop share

Showing that as income increases, there is greater diversification away from crops. In addition, age of HH head, higher dependency ratio has positive relation with diversification. HHs located in the highlands with access roads and markets have more diversified income than HHs located in lowlands.

A study in Northern Ethiopia by Woldehanna and Oskam (2001) showed that farm HHs diversify their income sources into off-farm wage employment motivated by low farm income and availability of surplus family labor. Accordingly, farm HHs have upward sloping, although inelastic, off farm labor supply curves. They concluded that increasing the availability of off farm activities and improving the wage rate received by farm HHs can expand the economic activity in the region. Woldehanna and Oskam also identified entry barriers to diversification such as credit constraint and lack of skill that should be addressed by providing rural credit and technical training for the poor.

A study in Afar pastoral area shows that pastoralists have diversified their income using the natural resource available in the area. Accordingly, pastoralists were trained on how to control *Prosopisjuliprofera* (an alien invasive plant that was introduced to Ethiopia primarily for soil conservation and now claimed most of grazing land) to change into charcoal. Accordingly, significant portion of pastoralists benefited from this income diversification. The diversification process in this case is due to the presence of natural resource and depletion of livestock wealth because of recurrent drought that occurred in the area (IIRR *et al*, 2004). In addition, the institutional arrangement made by NGO working in the area in collaboration with the government was one of the factors to diversify their income using available natural resource.

A study in Borana by Wassie *et al* (2005) showed that pastoralists have been on the process of diversification. They estimated pastoral and crop production function using Cobb-Douglas and trans-log models to analyze the economic rationale behind the growing pastoralist shift to cultivation and other non pastoral activities. Accordingly, the major factor for the shift was identified as low return to labor in traditional pastoralism that resulted in surplus labor which can be gainfully transferred to non-pastoral activities. As to determinants of diversification, they estimated multinomial logit for the activity portfolio selection among the HHs and found that age of HH head, literacy level and access to market were significant factors to diversify income port folio.

While analyzing the livelihood diversification process in developing countries, different authors tried to see the impact of diversification on poverty level of HHs. The impact of income diversification on poverty status of HHs depends on the primary motive beyond diversification. In areas where the HHs are diversifying their activity portfolio to escape from poverty, diversification is associated with low income. This situation has been proved by many authors where diversification is associated with lower income (Walker and Ryan, 1990; Von Braun and Pandya-Lorch, 1991; Adams and He, 1995). However, some authors found a positive relationship between diversification and total income in Burkina Faso, Mozambique and Nigeria (Matlon, 1979; Reardon *et al* 1992; Tschirley and Weber, 1994).

A study in Kenya by Oyugi (2000) showed that off-farm employment has positive effect on improving the HH welfare level measured in HH calorie consumption. He used probit model with seven explanatory variables that include holding area, livestock unit, the proportion of HH members able to read and write, household size, sector of economic activity, source of water and off-farm employment. Among these variables, education level and off-farm employment were the most significant variables.

Crole-Rees (2002) studied livelihood diversification in Mali and its effect on total HH income. Accordingly, he found that the direct effect of diversification is a change in output level in the subsistence, crops and non-crop sectors. In addition, availability of goods for home consumption and market will increase. Crole-Rees also discussed the effect of diversification on the total income distribution and he concluded that it is ambiguous. Accordingly, the relationship between income diversification and distribution depends on the link between diversification and total income. He further concluded that non-farm income is more unequally distributed than total income and it will exacerbate inequality among HHs.

Block and Webb (2001) studied dynamics of livelihood diversification in post famine Ethiopia. The authors tried to investigate whether higher income diversification was associated with higher consumption levels. Accordingly, they found that wealthier HHs tended to have more diversified income streams. They found that increased diversification is positively associated with changes in well being over time.

A study by Mulugeta (2002) in Boke Wereda of west Harerghe zone showed that off farm income has significant and positive effect on improving the HH food security status. He used

logistic regression model with fourteen explanatory variables including off income. The significant variables include family size, number of oxen owned, the use of fertilizer, food expenditure pattern, number of livestock owned, size of cultivated land, off-farm income and income per adult equivalent.

# 3. RESEARCH METHODOLOGY

## 3.1. Description of the study area

The study was conduct in Dabat Woreda. Dabat Woreda is found in north Gondar zone of Amhara regional state. It is located about 817 km from capital city of Addis Ababa and about 75 km north eastern direction of Gondar town on Gondar - Semien mountain national park roadway. Dabat is found North of Debark Woreda, South of Wogera woreda, East of Wogera and Debark woreda and west of Tsegeda and Lay Armachiho Woreda. It is one of the 23 Woredas in North Gondar Zone.

The data required from the Woreda office of agriculture indicated that the topography of the Woreda largely characterized by mountainous with slop of 16%-50%. Its altitude range from 1,500 to 3,200 meter above sea level, the total annual rainfall also ranges from 800mm to 1400mm. The average annual rainfall is 947mm. the rainfall pattern generally is bimodal, with over 90%falling between April and August. The main rainy seasons (kremit) extend from June until the end of August and the dry seasons (Bega) from October to February. The mean annual temperature is also varies between 18℃ to 32℃ with the average 23℃ the temperature of the area is generally categorized in humid but currently it is highly influenced by deforestation and land use change. As the climatic zone of Ethiopia is categorized as Wirch, Dega, Woinadega, Kolla and Berha, among these, three of them found in the study area. The main agro climatic zone of the woreda were Dega which is cover 52% of the total area, Woinadega and Kolla cover 14% and 34% of the total area respectively.

The current land use land cover types of the Dabat Woreda comprises of cultivated (arable) land which cover the largest proportion of the area about 23% (28293 ha), grazing land 12.3% (15200 ha), bush/shrub land 6% (7029 ha), forest and grass land 5% (6039 ha) and village and construction 16% (19243 ha) of the total area of the woreda (NGZFED, 2009). Similarly, majority of the tree in the woreda were bushes and shrubs. This is not the only species but also a substantial amount of natural forest also exist which is mainly composed of junipers species while the main fauna in the woreda are livestock, lions, hyena, fox etc. as most of the highlands

of the country, in the land holding size of farmers there is significant variation in the size of land holding among sampled household heads in the study area. The minimum and maximum size of land holding were 0.25 ha and 2.825 ha respectively. The average was being 1.10 ha (se table 4.8).

The livelihood base of the woreda is dependent on rain fed subsistence mixed farming system with more of traditional cultivation practice. Moreover, the study area was well known by its low production of crop and livestock due to land degradation and shortage of grazing land because of population pressure and other human and natural induced problems. However, crop production and livestock products were the principal source of income for the farmer (Dabat Bureau Of Agriculture 2009)

Since crop production is mainly depending on the summer (keremt) rainy seasons in the study area, there is only one cropping season and it starting from June. Sometimes before summer seasons, there is very short rain seasons used for making ready seedbeds and land preparation for summer seasons but it does not consider as Belg season. The summer rainy seasons were used for seedling cereal crops like wheat, teff, lentil, maize and chickpea. Although the rainfall is optimum in the highlands (Dega) part of the woreda and it become declined as we move away to the south-west direction. Based onsuch natural variation, in the highland where rainfall is optimum the predominant types of crops grown in the area were wheat, teff, and barley and melt barley. While, rainfall is less optimum farmers mainly grow maize and niger seed (nuge) in which cereal crops are more dominant. Farmers also keep a significant number of livestock (cattle, sheep, goat, etc…) for various purposes in addition to income generation (Dabat Bureau of Agriculture 2009).

Soil texture of Dabat woreda ranges from sandy to loamy soil and the colors varies from red to black. The red soil commonly found on the hill slops and black soils on the flat area. The main soil type exhibit a general relationship with altitude and slop, because of this soil erosion has made cultivation infeasible in several parts of the woreda. The rode network between kebeles and service cooperatives are well connected which makes access to highland (Dega climatic zone) of the woreda vary easy.Even though, the ecosystem is unstable characteristics in the woreda at the whole, it become more unstable as one gose away to the south-west wards which are kola agro climatic zone of the woreda where 12 kebeles are located. In this climatic zone malaria, typoid and other water born disease were exist, while the human health is safe in Dega climatic zone as

compared to kola. Intermittent hazard like frost, excessive rainfall and incidence of animal disease like anthrax which occur every other year and Africa horse sickness and black leg are the most dominant diseases in livestock in livestock products (Dabat Bureau of Agriculture 2009).

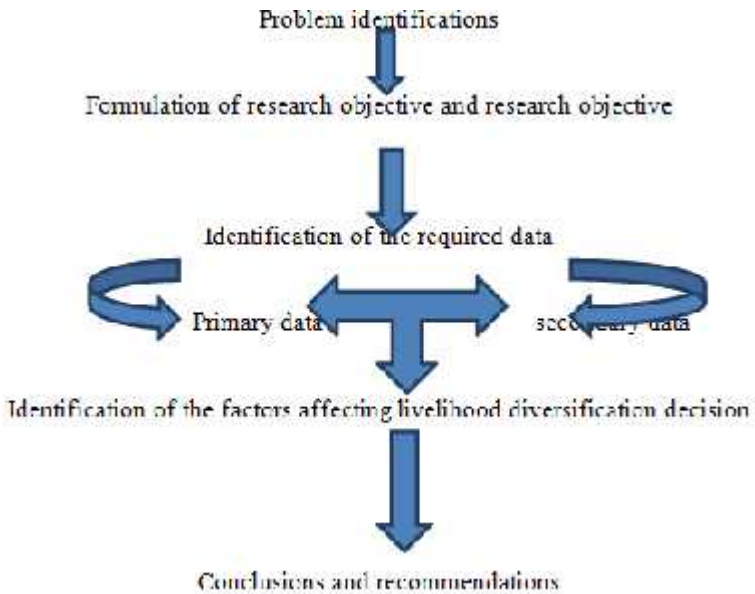
## 3.2. Research approach

This research used both primary and secondary data to analyze the factors affecting livelihood diversification decision. It could be filed research from targeted group through direct contact for primary data sources and also analysis of different articles, books, unpublished official reports and other related documents in order to understand the case through secondary sources. This research approach designed in a descriptive survey with cross sectional and observational studies. Both qualitative and quantitative data types were in combination applied to support each other in different level of the research.

### 3.2.1 Research Design

The process of the research starts with defining research problem, research objective and questions, identification of the required data and data collection. On the bases of these, analysis and discussions was made and drew same sort of conclusions and recommendations. The overall research design is illustrated in the figure below.

**Figure 3.1 Research Design**



### 3.2.2 Data Source and data collection methods

To acquire relevant qualitative and quantitative data for this study, both primary and secondary sources were used. Secondary data were obtained from literature both scientific and non-scientific reports, published and unpublished materials from CSA, bureau of agriculture and natural resources. Data from secondary sources were used in order to supplement the qualitative result from structured questionnaire.

Primary data sources were collecting by using combination of methods such as structured interview through close ended and response option interview questions, focus group discussion, formal and informal interviews (key informants) and field observations.

All the necessary detailed information about the factors affecting livelihood diversification decision has been collected from sample household farmers of each kebele through a farm household survey. At the first stage of the survey, an informal meeting with key informants (farmers, elders peoples, and development agents (DAs) was held to gain in depth knowledge and understand general agriculture and socio economic situations of the study area.

The translated questionnaire was first pretested with 15 farmers so as to make it comprehensive before the full execution of the interview process. The questionnaire was amended by the feedback obtained after the pretest.

To build up the respondents trust, the enumerators was informed to each household heads about the purpose of the survey and why she/he was chose for the interview. Four (4) enumerators /interviewers/ were selected based on their proficiency on the local setting and understanding of the subject matter. One day of intensive training on how to conduct interview and recording information in the questioners were given by the researcher. At the end of the formal survey in each kebele, discussions were held by the researcher and the four (4) enumerators.

Focus group discussion: three focus group discussions had taken place for this study with community elders and woreda experts to gather qualitative data and to get an in depth information about the overall livelihood diversification process. Key informants interview: key informant research instrument is crucial to clearly understand the livelihood diversification decision of the community. Therefore, for the key informant (KI) interview, individuals who have had better knowledge of the case understudy include KIs were model farmers, development

agents, and others. Moreover, researcher own observations (transect walk) of the sites was used to understand the overall livelihood diversification strategies to cross-check data generated through household survey and key informants.

### 3.2.3 Sampling Technique

In this study probability sampling method was employed. Under probability method, multistage systematic random sampling techniques were used. Dabat woreda was selected for the study because its more food insecure area compared to other Wored as, the different factors affecting livelihood diversification in the area is not studied, And the researcher works the area for the past five years/HABP program/ as food security expert which give the chance to know the problem closely.

From each stratum (agro-climatic zone) randomly select sampled kebeles by considering principle of proportional representation. Finally, for the selection of household heads that was the target of the study and involve in the detail personal interviews, simple and systematic random sampling technique had been used to select a total of 376 sampled household heads from among 13996 total household heads lived in the sampled kebeles. The sampling was done using the list of all household heads in sampled kebeles (sampling frame) which was obtained from the kebele agricultural office.

Distribution of sampled kebeles by agro- climatic zone

**Table 3.1 Sampling of Kebele Administration**

| **26 rural kebeles** | | **Sample kebels** |
|---|---|---|
| Dega 11kebeles | | 4 kebeles |
| w.dega 3kebeles | | 1 kebeles |
| kola 12kebeles | | 4 kebeles |
| **Total** | **9 Kebeles** | |

Source: own survey, 2016

### 3.2.4 Sampling procedure and sample size

The total sample size was determined by using the following formula by taking 95% confidence level; provide simplified formula to calculate sample sizes (mesay mulugeta, 2009).

SS = $\frac{Z^{2*}(p)^{*}(1-p)}{C^2}$ where, Z = Z value (e.g. 1.96 for 95% confidence level)

P = percentage picking a choice, expressed as decimal (.5 used for sample size needed)

C = confidence interval, expressed as decimal (e.g. 0.5 = ± 5)

Correction for finite population

New $SS = \frac{SS}{1+\frac{SS-1}{POP}}$ where: POP = population

Therefore, sample size;

$$SS = \frac{1.96(0.5)(1-0.5)}{0.5^2}$$

= 384.6 correction for finite population

$$\text{New } SS = \frac{384.16}{1+\frac{384.16-1}{13996}}$$

= 375.8 ~ 376. Accordingly, the total sample household size was 374.

To determine proportional sample size from each kebele to the total sampled population, the researcher used proportional stratified sampling. Subsequently the 376 interviewee sample house hold head of each kebele (n) can be, therefore, calculated using the following formula; and the thick point was determined by lottery method (mesay mulugeta, 2009).

n = $\frac{N1(S)}{\sum N}$ where, n = sample size of each kebele N1 = total household head of each kebele.

S = total number of household head in the study area.

$\sum N$= summation of total number of household head in the study area.

Table 3.2 Distribution of Sampled kebele and households

| Agroecology | Sample kebels | Sample kebel HHs | Sample HHs |
|---|---|---|---|
| **Dega** | Charbita | 1584 | 43 |
| | Chela | 1069 | 29 |
| | Wakinzuria | 2736 | 74 |
| | Janbelew | 1431 | 38 |
| **WoinaDega** | Deromamay | 2040 | 55 |
| **Kolla** | Arebur | 1468 | 39 |
| | Gurnamba | 1678 | 45 |
| | Iyrefeda | 1272 | 34 |
| | Kenta | 716 | 19 |
| Total | | **13996** | **376** |

Source: own survey, 2016

### 3.3. Method of data analysis

The data generated from primary and secondary sources were analyzed and interpreted quantitatively and qualitatively by using both descriptive and econometric tool. These are outlined and discussed in the following sections.

#### 3.3.1 Descriptive Statistic

Under descriptive statistic techniques mean, standard deviation, frequency and percentage were used.

#### 3.3.2 Model specification

Binary Logit regression model was used to analyze the factors that determine household's decisions in diversified livelihood activities through identified factors or a set of predictors that are affecting the likelihood of households' decision to adopt livelihood diversification.

In adoption decision studies, response such as whether farmers adopt a given practice could be Yes or No, is typically case of dichotomies variable. The model that is suggested for such binary dependent variable was the cumulative logistic function (Binary Logit) model. Hosmers&Lamesshow (1989) has pointed out that the binary logistic regression model has advantageous over the other in analysis of dichotomous dependent variable. It is extremely

flexible, relatively simple from mathematical point of view and lends itself to a meaningful interpretation (hosmers&Lameshow (1989).

### 3.3.3. Binary logistic regression model

Following Gujirati (1988) and Hosmers Lameshow (1989) the binary logistic regression distribution function can be specified. The model can have an arbitrary number of parameters and terms in the model representing qualitative and quantitative variables, and interaction terms in order to model dichotomous or categorical outcome variable. When explanatory variables are included to model probabilities, a problem is that probabilities are restricted to the domain between 0 and 1, whereas a linear effect for an explanatory variable could take the fitted value outside this interval. Instead of the probability of an event, one may consider the odds: the ratio of the probability of success to the probability of failure. When the probability of success is p, the odds are p/(1-p). In contrast to probabilities, odds can assume any value from 0 to infinity, and odds can be considered to constitute a ratio scale. The logarithm transforms a multiplicative scale to an additive scale.

Indeed, one of the most widely used transformations of probabilities is the log odds, defined by

$$\mathbf{logit}(p) = In\left(\frac{p}{1-p}\right)$$

Where ln(x) denotes the natural logarithm of appositive number x. The logit function is an increasing function assuming values between 0 and 1, and it is defined over the set of real numbers. The logistic regression model is a model where log it(p) is a linear function of the explanatory variables.

For a binary response variable, the logit transformation of success probability, pi of the *ith* individual can be modeled as a linear combination of k explanatory variables

X1i, X2i,…,Xki, so that

$$\mathbf{logit}(pi) = In\left(\frac{pi}{1-pi}\right) = \beta 0 + \beta 1\ \text{X1i} + \beta 2\ \text{X2i} + \ldots \beta \text{kXki}.$$

This implies

$$pi = \frac{e^{\beta 0 + \beta 1\ \text{X1i} + \beta 2\ \text{X2i} + \ldots \beta \text{k Xki}}}{1 + e^{\beta 0 + \beta 1\ \text{X1i} + \beta 2\ \text{X2i} + \ldots \beta \text{k Xki}}}$$

Where; a model parameter $\beta i$ will be interpreted as the change in the *logodds*for a one unit increase in $\times i$, holding all the other predictor constant.

**Model adequacy checking**

According to Gujarati (2004), model adequacy checking is a paramount task. It is checking whether a set of predictors perfectly satisfy the model assumption and theory.

**Overall model test**

Before proceeding to examine the individual coefficients, we want to look at an overall test of the null hypothesis that all coefficients for all of the variables in the model are zero.

In other words,

Ho: $\beta 1 = \beta 2 = \ldots = \beta k = 0$

H1: not all $\beta 1 = 0$ (at least one of the predictor is significantly related to the response variable) this can be tested using the likelihood ratio chi-square test at *k* degrees of freedom.

$xc^2 = 2(1nL_k - 1n\ L_0)$

Where $1nL_k$ is the log likelihood value for the model containing all k factors and $1n\ L_0$ is the log likelihood value for the model containing only the intercept.

The null hypothesis is rejected if $xc^2 \geq x^2(a, k)$or the p-value is less than 0.05.

**Test of goodness fit**

Once the model is developed, to know how effective the model is in describing the outcome variable. This referred to as goodness of fit test. In testing the hypothesis that the model fit the data using, the Hosemer and Lemeshow test.

Hosemer and Lemeshow test: The null hypothesis for this test in that the model fits the data, and the alternative hypothesis is that the model does not fit the data (see details in Gujerata, 2003).

The test is written as:

H0: the model adequately fits the data

H1: Not H0

The null hypothesis is rejected if the p-value is less than 0.05.

In addition to goodness-of-fit test, to look at the classification table which tells how many of the cases where the observed values of the dependent variable have been correctly predicted. Each model for contingency table has a set of cell expected frequencies, which are numbers that perfectly satisfy the model and give the best fit to the observed counts.

**Definition of variables and working hypothesis**

**The Dependent Variable of the study (Yi),** the dependent variable of the model for the logit analysis has dichotomous nature representing the observed status of the household in livelihood diversification decision. In the case, 1 represents diversified household and 0 non-diversified household.

For this research, diversification is defined by considering the implementation of at list one livelihood activity beyond on farm activities (crop and livestock) by the household head. Hence non-diversified household includes those who never practiced other livelihood activities except agriculture.

**The independent variable of the study (xi),** the household decision to practice agiven livelihood activities is influenced by the rang of explanatory variables considered. In this research, the variables considered related to household (personal) characteristics, land characteristics, institutional, and social factors the livelihood strategy they practiced. These are assumed to be potential factors for household decision to practiced livelihood activities.

**Table 3.3 descriptions of all explanatory variables used in the model**

| Variables name | Descriptions |
|---|---|
| **Livelihood diversifications decision** | A dependent variable measuring whether a given livelihood activities beyond agriculture 1 if they are diversified household, 0 otherwise. |
| **Age** | Age of the household head in year |
| **Sex** | Sex of the household head; dummy(1 if male; 0=female) |
| **Education** | Education of the Household head dummy(1 if litrate ; 0=illitrate) |

| | |
|---|---|
| **Family size** | The family size of household head. |
| **EAFM** | economically active family members (EAFM) were >14 and <65 |
| **Distance to woreda market** | Average distance of a market from residence (in walking minutes) |
| **Livestock** | Livestock holdings of the household in TLU |
| **Land** | Total land area of a household owned in hectare |
| **DA visit** | Dummy, 1 if household getting credit, 0 otherwise |
| **Advise/ training** | Dummy, 1 if household getting advice/ training, 0 otherwise |
| **Credit** | Dummy, 1 if household used credit, 0 otherwise |
| **Remittance** | Dummy, 1 if households received remittance; 0 otherwise |
| **Cooperative** | Participation of the household in cooperatives 1 if households participate; 0 otherwise |

Source: own survey, 2016

**Explanatory variable**

**Age -** Older people are more likely to diversify their likelihoods than of younger households, but risk averseness increase with age (Abebaw, 2003; Ayalew, 2003). Hence either positive or negative signs are expected to influence adoption. It is hypothesized that younger farmers have more probability of diversifying the livelihood strategies.

**Sex -** Male-headed households are more likely to get information on livelihood strategy options and new technologies and undertake risky businesses than female headed households. It is also argued that having a female-headed household may affect the diversification of livelihoods and other options (Ayalew, 2003;Yilma, 2005), as women may have limited access to information, and other resources due to socio-cultural barriers.

**Education level -** Level of education is believed to be associated with access to information on livelihood diversification strategies and productivity consequences (Tegegne *et al*, 1999; Ashimogo, 2000). Education is therefore expected to increase the probability of the implementation of various livelihood diversification measures.

**Family size –** Family size is an important factor for livelihood diversification. Reardon (1997) had observed that family size affects the ability of a household to supply labor to the farm. In a large family some members could remain engaged in traditional farming while others could opt for non-farm activities. It will also reduce the risk of livelihood failure. We therefore hypothesized a positive relationship between livelihood diversification and family size.

**Household Members Aged between 15 and 65 Years -** There are two assumptions regarding the influence of the household size on the use of adaptation strategies. The first theory is that households with large families may be forced to divert part of the labor force to off-farm activities in order to earn income for buffering the consumption pressure imposed by a large family. The other assumption is that large family size is normally associated with a higher labor endowment, which would enable a household to accomplish various agricultural tasks (Eshetu, 2000; Mulugeta,2002; Yilma, Therefore, it is hypothesized that a farm household with larger number of workers is more likely to be in a position to try and continue using a potentially profitable innovation and it is expected to influence livelihood diversification positively.

**Distance to woreda market -** This variable is proposed to be measured in terms of distance of the household from the output market. It is hypothesized that market access will positive correlation to likelihood diversification measures, since market serves as a means of exchanging information with other farmers (Ellis, 2000).

**Number of Livestock -** Livestock plays a very important role by serving as a store of value and by providing traction and manure required for soil fertility maintenance Livestock is the farmers' important source of income, food and draft power for crop cultivation in Ethiopian agriculture. Availability of money households own ease the financial constraints households face and allow them to purchase inputs such as fertilizer, seedlings and irrigation facilities (Abebaw, 2003;Hilina, 2005).

Hence, a household with large livestock holding can have good access for more draft. Livestock ownership is hypothesized to be positively related to the implementation of various livelihood diversification measures.

**Farm size -** Studies on adoption of livelihood diversification strategies indicated that farm size has positive effects on adoption of likelihood diversification. Farm size is an indicator of wealth and social status and influence within community. Farmers with larger land size can afford the expenses on new agricultural technologies and also can bear the risk in case of failure of crop Adugna and Wagayehu,(2012); Dilruba and Roy, (2012), This means that farmers who have relatively large size will be more initiated to diversify their likelihoods.

**DA visit –**the regularity of the development agent's visits, the farmers and non-farm activity participation has positive relationship Demissie (2003)

**Advice / training –** Most of the non-farm activities being skill based, training increases the possibility of getting non farm jobs (Samuel, 2001). Therefore, a positive relationship was assumed between livelihood diversification and training.

**Credit –** Availability of credit eases the cash constraints and allows farmers to buy purchased inputs such as fertilizer, improved crop varieties and irrigation facilities. However, poor farmers cannot afford to invest in irrigation for adaptation, or sustain their livelihoods during drought seasons (Abdulahi & Crole-Rees, 2001; Weldehanna & Oskam, 2001). Therefore, it is hypothesized that access to credit will increase the probability of diversifying their livelihood strategies.

**Remittance –**households who have chance of receiving the remittance, the probability of participation in diversified livelihood sources has positive relationship (Adugna and Wagayehu, 2012).

**Cooperative -** Membership of a formal social organization like Self-help Group (SHG)/co-operative/ village committee, etc. is an important social capital in determining livelihood diversification. Membership of a SHG elevates his/her social status and increases access to common property resources as well as different government/NGO schemes Bezemer and Lerman (2002). Therefore, we hypothesized a positive relationship between livelihood diversification and membership of social organization.

# 4. RESULT AND DISCUSSION

The results of the study are presented and discussed in this chapter. The first section presents results of the descriptive statistical analysis. The second section deals with the discussion of the Logistic regression model outputs.

## 4.1 household characteristics and Diversification Level

The results indicated that out of the 376 sample household respondents about, 72.3% were male headed households and only about 27.7% were female headed. Regarding the level of education, about 51.1% of the respondents were illiterate. As indicated in table 4.1 out of this sample household head who are illiterate, 64.5%were male and the remaining 35.5% were female.

**Table 4.1 sex and education level of respondents**

| | | Level of Education | | Total |
|---|---|---|---|---|
| | | Illiterate | Literate | |
| Sex of the respondent | Female | 68 | 36 | 104 |
| | Male | 124 | 148 | 272 |
| Total | | 192 | 184 | 376 |

source; own survey, 2016

The survey result also showed that minimum and maximum age of respondents was 27and 86years with the mean age of 48.6.Relatively (on average), the more aged (47.63) households were those who used agriculture only as their common source of livelihood. Minimum and maximum household sizes are 1 and 12 respectively with the mean household size of 5.2 and standard deviation of 1.968. The minimum and maximum number of economically active household member with ages >15 and <64 years is 1 and 7respectively with the mean number of 3.06 and standard deviation of 1.471.The minimum and maximum livestock holding in TLU for the respondents was 0.00 and 14.90 respectively with the mean livestock holding in TLUof 3.9163 and standard deviation of 2.52417. Average distance to the nearest market is conceived as the house hold head time taken to reach to the nearest market from homestead. The Minimum and maximum times taken to the nearest market were 20 and 420 minutes respectively, with the average distance of 220 minutes (table 4.2). The household head goes far distance and took more time is expected to have influenced his livelihood diversification decision.

**Table 4.2 general characteristics of respondents**

| | Age of Respondents | Family size | EAFM | Average distance of a market from residence (in walking minutes |
|---|---|---|---|---|
| Mean | 48.62 | 5.22 | 3.07 | 79.16 |
| Std. Deviation | 12.05 | 1.97 | 1.47 | 64.46 |
| Minimum | 27 | 1.00 | 1.00 | 20.00 |
| Maximum | 86 | 12.00 | 7.00 | 420.00 |

Where: economically active family members (EAFM) were >14 and <65;

Source; own survey, 2016

## 4.2 land characteristics of respondents

The minimum and maximum land holding size in the study area is 0.25 ha and 4 ha respectively, with the mean of 0.9154 ha. About 98.4%of the sample household were their own land, and 1.6%of the sample household have no their own land. The result shows that there is a shortage of cultivated land in the study area. Key informants suggested that land fragmentation is a serious problem that poses serious challenge to farm management because peasants should walk to their farm plots for about 40 minutes on average.

**Table 4.3 land characteristics**

| Response | Frequency | Percent |
|---|---|---|
| No | 6 | 1.6 |
| Yes | 370 | 98.4 |
| Total | 376 | 100.0 |

Source: own survey, 2016

### 4.3 institutional support and Diversification Level

#### 4.3.1 Access to credit, training and extension services

Recently, among the modern agricultural institutions credit and extension services play an important role in facilitating agricultural development in general and livelihood diversification in particular. As most of the farmers are subsistence farmers and have had financial capacity constraint they are not able to buy and use farm modern inputs on their filed (sabita, 2010).

The poor households in the rural area need credit facilities to develop their livelihood strategy. Without access to institutional credit they are not able to undertake any income-generating activity which requires some initial investment. As a consequence, they are forced to engage themselves in less remunerative non-farm work and wage work. In the study area, about 48.1%of the household respondents did not use credit service for lack of collateral requirements of the financial institutions and some households take the credit without any business plan preparation with high interest rate, and they are unaware about the schemes provided by the government for the development of rural sector/livelihood diversification/. So, it was found that among the total respondents 51.9% of them used credit service offered for different agricultural purpose including purchasing farm input and other household basic necessity but, not for livelihood diversification activities. In the absence of credit support from the institutional agencies, the resource poor households are not able to start their own nonfarm business or enterprises. According to Katona-Apte (1988) had reported the vital role played by the Bangladesh Grameen Bank in providing credit to women which enabled them to carry out diversification activities.

The survey result showed that 17% of the respondent household head getting training and about 83% of them did not getting training. In line with this, during the focus group discussion, farmers revealed that currently practiced livelihood activities on their holdings, had also been in place before getting training, nothing has changed. According to them this is because the extension agents give more emphasis for agricultural issues, and they gave less attention for livelihood diversification issues. As a result, rural households have no information regarding modern income-generating activities. They remain engaged with their traditional activities.

The objectives of extension is to change farmers outlook towards their difficulties which assists them adapt better solution to their livelihoods (Samuel, 2001).Thus, the information obtained and the knowledge and skill gained from extension organization may influence farmers' skill and decision making on seeking diversification. The frequent extension contact received will increase the tendency of household to participate in off farm activities. This may be also explained by the factors that the message/contents that farmer gain from extension agents help them to initiate to use risk aversion strategies that seek diversification of income within and out agriculture. Agricultural extension service in the study area offers various assistance in the form of technical advice such as provision of improved seeds, improved practices, close supervision and frequent visit, training, provide technical information and access to new technology. The survey result showed about 73.1% of the respondents household used extension services through frequent contact with agricultural extension officer. Only about 26.9% of them had no frequent contact with the development agent.

**Table 4.4 Credit Services of Respondents**

| Credit Services | Frequency | Percent |
|---|---|---|
| No | 181 | 48.1 |
| Yes | 195 | 51.9 |
| **Total** | **376** | **100.0** |

Source: own survey, 2016

**Table 4.5 Extension service**

| **Extension Services** | **Frequency** | **Percent** |
|---|---|---|
| No | 101 | 26.9 |
| Yes | 275 | 73.1 |
| **Total** | **376** | **100.0** |

Source; own survey, 2016

### 4.3.2 Remittance from relatives and diversification level

Receiving remittance itself is additional source of income for the farm household, and this in turn helps the farmers to expand the income activities (Adugna and Wagayehu, 2012). The survey result indicates that 13.8% of the sample households are having opportunity of receiving remittance and 86.2% of the samplehouseholds have no chance of receiving the remittance. According to one of the woreda experts the migrants send remittance to their families. On the other hand, though limited, some of the family members of the communities also move to towns to work and generate income so receiving remittance is a source of income in the area but, the feeling they have about remittance and livelihood diversification both before and after receiving remittance remained the same.The result is in line with the findings of KejelaGemtessa,BezabihEmana and WaktoleTiki(2005) inBorana Pastoral Communities of Ethiopia They found that the contribution of remittance and BuusaaGonofato the annual income of the destitute households is as high as 20 percent. It is the second largest source of income next to crop production for the destitute households.

**Table 4.6 household received remittance**

| Remittance | Frequency | Percent |
|---|---|---|
| No | 324 | 86.2 |
| Yes | 52 | 13.8 |
| Total | 376 | 100.0 |

Source; own survey, 2016

### 4.3.3 Participation in cooperatives and diversification level

In the study area, from all sample kebeles there is RUSSACOs established and it mobilize the saving and credit opportunities, however it was found that among the total respondents 49.7% of them participate in cooperatives the remaining 50.3%of the household respondents did not participate in cooperatives.

**Table 4.7 Membership on cooperatives**

| Cooperative Membership | Frequency | Percent |
|---|---|---|
| No | 189 | 50.3 |
| Yes | 187 | 49.7 |
| Total | 376 | 100.0 |

Source; own survey, 2016

### 4.4 The common means of livelihood beyond agriculture for rural households in the study area

The survey result indicates thatabout 55.3% of the HHs heads have diversified their livelihood activities portfolio. And the remaining 44.7% of the HHs have not diversified (only practice agricultural activities).

**Table 4.8 livelihood diversification decision**

| Livelihood Diversification | Frequency | Percent |
|---|---|---|
| Non diversified | 168 | 44.7 |
| Diversified | 208 | 55.3 |
| Total | 376 | 100.0 |

Source: own survey, 2016

To answer the question, what are the common means of livelihood beyond agriculture for rural households in the study area? While measuring diversification, several methods can be applied. Among these includes number of productive activities, percentage of income from various activities in total income and the Theil's diversity index are the major (Crole-Rees, 2002). Hence in this study, the first method, i.e. number of productive activities will be used to measure the level of diversification. In this case, productive activities are disaggregated in to crop production, non-crops, farm or nonfarm and off farm activities. In the study areas, we tried to identifying the common livelihood activities carried by each household in the study area beyond agriculture. The data were obtained directly from the diaries with no data processing, from experts. The common

livelihood strategies/activities consist of sale of wood, trading of ox, trading of cash crops, coble stone work, small construction, traditional weaving, modern weaving, small business, selling local beer, copy machine, repair mobile phone, pool house, men barberry, female beauty salon, work in road construction, remittance from relatives etc. To reduce the complexity and have a better grouping, by considering the nature of the livelihood activities, we divide all these into five livelihood sectors, namely Trade, Construction, Manufacturing, Service, and Employment.

The survey result showed that the majority 41.2% of HHs in the sample are participating in trade sector. The second most common participated sector is employment (22.6%) and a small number of HHs conducted other sectors such as service (17.3%), manufacturing (6.6%), and construction (5.6%).

**Table 4.9 percentage of HHs engaged in different sectors**

| Type of activity | % of HHs engaged |
|---|---|
| Trade | 41.2 |
| Construction | 5.6 |
| Manufacturing | 6.6 |
| Service | 17.3 |
| Employment | 22.6 |

Source: own survey, 2016

According to the results the majority 41.2% of households are participating in trade sector. Therefore, the common means of livelihood beyond agriculture of the HH head in the study area is the trade sector. This might be due to the availability of market at the local level and good opportunities of transportation between the kebeles. However, in the study area there are limited opportunities for market information and competition with global markets. For this reason, households have to depend on traditional local markets.

Our results reveals, that livelihood diversification are dynamic and show a high degree of diversification. This might be due to several factors. The households in the study area are responding to pressures and opportunities, seasonal variations, market demand and different skills can also affect livelihood diversifications. In responding to the above factors, household members are “doing something” that may result in completely different livelihood activities which may not be relevant to their competence or desire.

Furthermore, livelihood diversification varies with the household's characteristics, such as number of productive family members, age, education level and gender.

Gender is an integral and inseparable part of rural livelihoods. Men and women have different assets, access to resources, and opportunities. Women rarely own land, may have lower education due to discriminatory access as children, and their access to productive resources as well as decision-making tend to occur through the mediation of men. Women typically confront a narrower range of labor markets than men, and lower wage rates. In general, therefore, diversification is more of an option for rural men than for women. In this sense, diversification can improve household livelihood security while at the same time trapping women in customary roles.

**Table 4.10 Sex of the respondent * livelihood diversification decision Cross tabulation count**

| | | Livelihood diversification decision | | Total |
|---|---|---|---|---|
| | | Non- diversified | Diversified | |
| Sex of the respondent | Female | 46 | 58 | 104 |
| | Male | 122 | 150 | 272 |
| Total | | 168 | 208 | 376 |

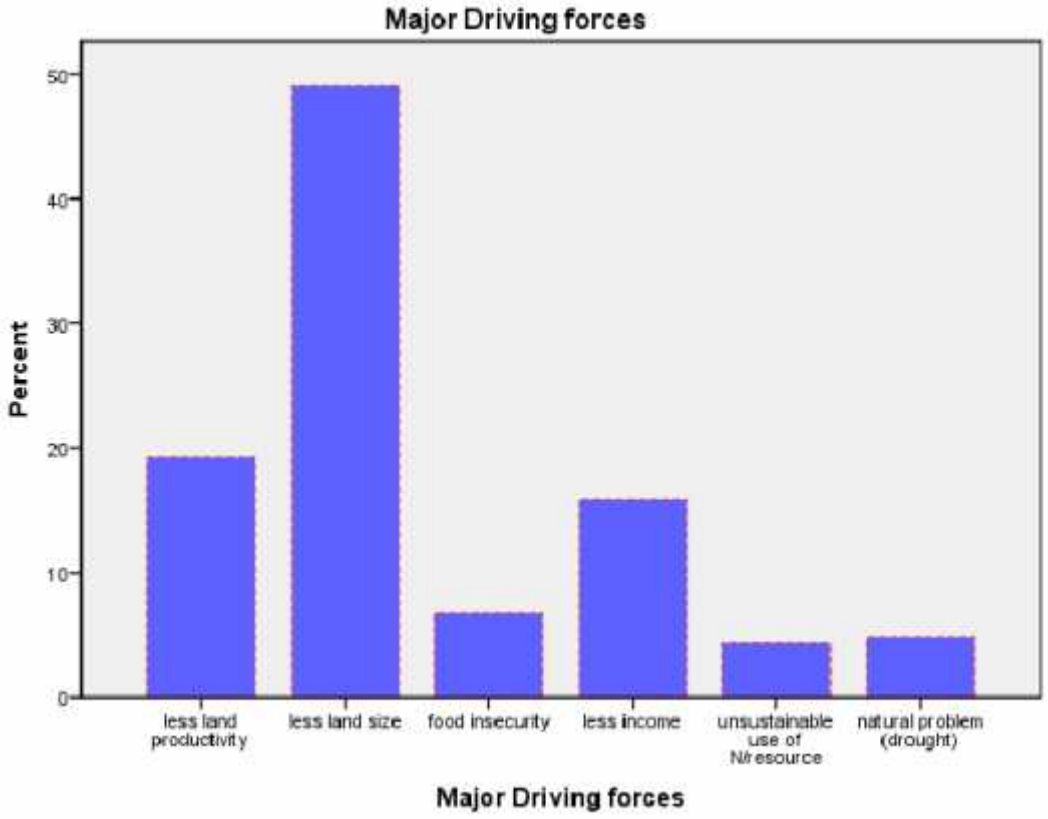
Source: own survey, 2016

### 4.5 The major driving forces to livelihood diversification

The other objective of this study was to identify the major driving forceswhy rural households engage in livelihood diversificationactivities besides farming. To fulfill this objective datawere obtained on six commonly identified driving forces whichare to; less income, food insecurity, less land size, less land productivity, unsustainable use of natural resources and natural problem (drought).The respondents were asked to rank these reasons on thebasis of priority, that is, from the first to the sixth. Thekey in the bar chart (R1-R4) indicates the ranking and thecolors of the ranks represents the value for each bar.The result of this analysis reveals that 49 percent of therespondents reported less land size as their first major driving forces forengaging in livelihood diversification, 19.2 percentconsidered less land productivity as their first or most driving forces , 15.9 percent reported less income as their first major driving forces and 6.7 percent reported food insecurity as theirfirst major driving forces, and 4.8 percent reported natural problem (drought) as their first major driving forces and 4.3 percent reported unsustainable use of natural resources as

their first major driving forces . The finding shows that the major driving forces why rural people engaged in livelihood diversified activitieswas lessland size. This is because among the major driving forces for engaging in livelihooddiversification, less land size had the highest score (49%) asthe first, against the other major driving forces for engaging inlivelihood diversification.

**Figure 4.1: Bar Chart showing major driving forces for engaging in livelihood diversification**




Source: own survey, 2016

### 4.6 Factors that influenced households decision to Livelihood diversifications

#### 4.6.1 Binary logistic regression analysis

Binary logistic regression analysis was used to examine the effects of each independent variable on households' decision to livelihood diversifications, while controlling for other independent variables. Before proceeding to the analysis, model fitness is considered for livelihood diversification decision.

### 4.6.2 Goodness of fit test

Goodness of fit test for the fitted binary logistic regression model is assessed using the Hosmer and Lemeshow test. According, the Hosmer and lemeshow test for the model resulted in p-values of 0.477, which tell us that the model adequately fit the data at 0.05 level of significant.

| Observed | | Predicted | | |
|---|---|---|---|---|
| | | livelihood diversification decision | | Percentage Correct |
| | | non- diversified | diversified | |
| livelihood diversification decision | Non- diversified | 103 | 40 | 72.0 |
| | diversified | 31 | 150 | 82.9 |
| Overall Percentage | | | | 78.1 |

Source: own survey, 2016

In addition to goodness- of fit test, we need to look at the classification table which tells us how many of the cases where the observed values of the dependent variable (livelihood diversification decision) are diversified or non- diversified have been correctly predicted. The result showed that 72% were correctly classified for non- diversified group and 82.9% for diversified group. Overall 78.1% were correctly classified.

### 4.6.3 Model Estimation

The result of model estimation is presented in table 4.12 the table contains the significant variables, along with the estimated coefficients, standard errors of the estimate and p-value. It also includes the odd ratios for ease of interpretation.

According to theBinary logistic regression result, out of 13 variables included in the model, 5 explanatory variables are found to be significant with respect to the likelihood of household's livelihood diversification decision. The variables are age of the respondent household heads, land size, getting training, access to credit services, receiving remittance

**Table 4.12 parameters Estimates of the Binary Logistic Model**

| Variables in the Equation | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Variables | B | S.E. | Wald | Df | Sig. | Exp(B) | 95% C.I.for EXP(B) | |
| | | | | | | | Lower | Upper |
| AGE | -.076 | .017 | 20.412 | 1 | .000 | .927 | .897 | .958 |
| SEX(1) | -.495 | .381 | 1.687 | 1 | .194 | .610 | .289 | 1.286 |
| EDUCS(1) | -.209 | .311 | .454 | 1 | .500 | .811 | .441 | 1.491 |
| FSIZE | .024 | .154 | .023 | 1 | .878 | 1.024 | .758 | 1.384 |
| NFA | -.250 | .195 | 1.632 | 1 | .201 | .779 | .531 | 1.143 |
| TIME | -.003 | .003 | 1.185 | 1 | .276 | .997 | .992 | 1.002 |
| TLU | -.153 | .079 | 3.779 | 1 | .052 | .858 | .735 | 1.001 |
| LSIZE | -.791 | .301 | 6.885 | 1 | .009 | .453 | .251 | .819 |
| EX(1) | -.562 | .378 | 2.212 | 1 | .137 | .570 | .272 | 1.196 |
| TRAINING(1) | .970 | .412 | 5.539 | 1 | .019 | 2.637 | 1.176 | 5.915 |
| CERIDT(1) | -1.351 | .313 | 18.613 | 1 | .000 | .259 | .140 | .478 |
| REMIT(1) | -1.307 | .476 | 7.525 | 1 | .006 | .271 | .106 | .689 |
| COOPERATIVE(1) | .286 | .313 | .836 | 1 | .361 | 1.331 | .721 | 2.458 |
| CONSTANT | 7.347 | 1.060 | 47.994 | 1 | .000 | 1551.266 | | |

Source: own survey, 2016

**Interpretation of econometric results**

**Age of household head:**the model showsthat the age of respondent heads is a significant variable. The probability or odds of household decision on livelihood diversification are higher for younger households as compared to those older age households. The negative sign indicates that, as the household head age increase, the decision for livelihood diversification decrease. According to the model estimation, it is to mean that, a one unit increase in the age of respondent household head is found to have decrease odds of livelihood diversification by a factor of **0.927** and the result is statistically significant at (p<.000) (table 4.11) The possible reason is that farmers whose age is relatively younger, leaving other factors constant, could be pushed to engage more in non-farm activities than agriculture alone. This is because, younger farm households cannot get enough land to support their livelihood compared to the older farm households. This result is congruent with previous studies by Barrett *et al*, (2001); Destaw, (2003), Rao*et al*., (2004); Adugna, (2005); Mulat*et a*l., (2006), Berhanu (2007), and Khan (2007).

**Land size owned (LAND):-** As hypothesized, the area of land owned by the household has a significant (P<0.05 and p<0.10) and negative correlation with the likelihood of households decision on livelihood diversification. The results of this study suggest that rural households with more land tend to follow agricultural extensification rather than diversifying from agriculture since they draw incentives of land productivity. It is to mean that, a one unit increase in the farm size is found to have decrease odds of livelihood diversification by a factor of **0.453** and the result is statistically significant at (p<.000) (table 4.11) On the other hand the probability of diversifying livelihoods decreases by increasing land size as farmers with more land supposed to stay on farm since land stimulates farming. It also implies that those households who expect secured agricultural income stay on farm and lower off-farm intensity. Lanjouw and Lanjouw (1995) also found out that landholdings per capita are negatively correlated with participation in low productivity occupations. This result is in line with that of Berhanu (2007), Mulat*et al*., (2006) and Khan (2007).

**Credit use (CREDIT):** credit use is found to have a significant (p< 0.05) negative impact on the likelihood of choosing diversified livelihood strategy. This implies that, the likelihood of participating in diversified livelihood strategy by the household drops by 0.259 for a household using credit. This negative impact may be attributed to the fact that credit use allows farmers to follow agricultural intensification by accessing farm inputs which in turn improves productivity. This more implies that the formal and informal credit facilities that avail for rural farmers are a very important asset in rural livelihoods not only to finance agricultural inputs activities, but also to protect loss of crucial livelihood assets such as cattle due to seasonal food shortage, illness or death (Tesfaye, 2003). The result of the study, therefore, strongly suggest that farmers' access and use of credit would play important role in promoting agricultural development rather than diversification. The result is also in agreement with that of Holden *et al*., (2004); Brown *et al*, (2006), Berhanu (2007), and Khan (2007). This implies that the incentive for accessing credit accelerates agricultural production.

**Receiving remittance (REMITA):**remittance refers to money sent from inside and outside the country. the binary logit model identified this variable as it had negative contribution to the diversification of livelihood strategies, at significance of <10 % probability level. This meant that, the likelihood of a household receiving remittance decrease choice of diversification by 0.271.This negative impact may be attributed to the fact that households use this for their basic

necessities; this implies that receiving remittance would help to fulfill their basic necessities and cope in case of shocks and important for keeping rural households diversify activities.

**Training:**This variable has a positive and significant ($p<0.10$) correlation with the likelihood of choosing farm and non- farm livelihood strategy instead of sustaining on agriculture alone. Keeping other factors constant; the likelihood of participation in livelihood diversification increases by 2.637 for those who have gained training than the counterparts. The objectives of training is to change farmers outlook towards their difficulties which assists them adapt better solution to their livelihoods (Samuel, 2001).Thus, the training obtained and the knowledge and skill gained from training may influence farmers' skill and decision making on seeking diversification. Most of the non-farm activities being skill based, training increases the possibility of getting nonfarm jobs. Therefore, a positive relationship were found between livelihood diversification and training.

## 5. CONCLUSION AND RECOMMENDATION

Based on the findings from the study, the following are concluded and recommended as possible areas of intervention for future improvement of household's life.

Livelihood diversification is a process followed by the households in the study area. Our findings reveal that livelihood diversification is high in the area however, current livelihoods seem not sufficient to provide security and it varies with location. Hence, instead of replacing farm activities with other income generating activities, it is better to promotestrategies that support the diversification process. Livelihood enhancement activities which are based on the available asset should be promoted. It was found those trade sectors are a highly diversified sector in term of the number ofhouseholds participating and is considered to be the most important source of livelihood beside farming. Thus promotion of such marketing activities should be promoted. Thus concerned regional governments, NGO and other parties should promote livelihood enhancement activities.The result of the binary logistic regression revealedthat out of 13 variables included in the model, 5explanatory variables are found to be significant up toless than 10% probability level. Accordingly, age of the household head, access to credit, receiving remittance and land size have negative association withlivelihood diversification strategy. Whereas,getting training has a positively influence onhouseholds choice of livelihood diversification.

Household livelihoods are highly diverse. Policy-makersneed to reflect on the most suitable ways of supportingthis diversity. Any attempt to intervene the communityneed to target specific groups of societies such as femaleheaded households, wage workers, petty traders, and thepoor. The intervention strategy should have a needsidentification to address both the basic needs as well asthe needs that arise from wealth category specificconstraints.

The agricultural sector of the district is characterized by land scarcity and increasing fragmentation of already very small farms, shortage of draught animals and lack of adequate grazing land. To this affect, the farming economy is not in a position to feed and sustain the increasing population of the area. This implies that the non-farm sector has to be developed to absorb more of the growing population. Thus, support to diversification away from precarious

livelihood strategy (agriculture) towards sustainable alternatives whose returns are not correlated with land - possibly agro-industry, education, and ginger marketing help to shift some proportions of farmers from direct reliance on land for their livelihoods and enhancing use of technologies.

The policy to promote adoption of credit to stimulate adoption of high yielding varieties and fertilizer use has not been very successful in the study area. Farmers were reporting that they failed to pose the later due to the absence of the former. Thus, enhancing and expanding rural credits to subsistence farmers in the district should be one of the primary areas of intervention and policy options

Receiving remittancerefers to money sent from inside and outside the country. Although remittances constitute only a small part of total household about 13.8% income on average,they appear not important for keeping rural households diversify activities. So awareness must be created by different stakeholders.

Getting training and advice of farm households should also be emphasized, since it has significant effect for farmers on creating different livelihood activities.

Based on the present study it is possible to conclude that the constraints of the rural households in choosing livelihood strategies that will lead them achieve food security goal should not be put aside since food security problem cannot be overcome by simply concentrating on the farm sector alone; intersectional issues and farm and non-farm linkages need to be addressed as well. Moreover, the contribution made by non-agricultural sector to rural households is a significant; although for the poor these activities are survival oriented and have little to do with wealth accumulation.

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# 7. APPENDICES

## 7.1 Appendices 1 Interview Schedule for sampled households in Dabatworeda

**UNIVERSITY OF GONDAR**

**COLLEGE OF AGRICULTURE AND RURAL TRANSFORMATION**

**DEPARTMENT OF AGRICULTURAL ECONOMICS**

For DabatWoreda Farmers Only

**Dear Respondents**: the purpose of this questioner is mainly designed to assess the various factors that affect farmers' decisions on livelihood diversifications. The information you kindly provide will be used as a partial fulfillment of second degree under the department of Agricultural Economics. Thus, for the success of this study, you are selected as one of the key for the source of information. Therefore, you are kindly requested to provide your genuine response and be confidential by your response, it uses only for academic purpose.

Thank you in advance for your genuine cooperation!

**Instruction for interviewers**:

● make a brief introduction to each farmer before starting the interview: greet them in the local way: know each other and ask his/her/name: tell them to purpose and objective of the study:

● during the process:

1. write the answer of the respondent of the space provide

2. ask and write details where required

3. encircle or tick the chosen answer

● At the end, leave farmers with words of thanks.

1. Code ---------- 2. Date of interview ---------- 3. Kebele----------

**1. General information**

1.1 Name of the respondent----------

1.2 Sex of the respondent 1. Male 0. Female

1.3 Age of the respondent----------

1.4 Education level:

0. Illiterate 1. Abel Read and Write up to Grade 4

2. Grade attending above 4

**2. Household Characteristics**

2.1 Head of the household

1. Male 0. Female

2.2 Age of the household head: ----------(years)

2.3 Education level of the household head :

0. Illiterate

1. Abel Read and Write up to Grade 4

2. Grade attending above 4

2.4 Family number (family size):----------(in number)

2.5 Age of family member:

0-15 year----------(in number)

16-64 year----------(in number)

> 64 year ----------(in number)

2.6 Distance to woreda market ----------(in minute)

2.7 Do you have of livestock? 1. Yes 0. No

2.8 If your answer to question # 2.7 is yes, fill the following table

**Livestock ownership (number)**

| Livestock type | Livestock number at the end of the year 1996 | Change in livestock number holding the year 1997 | | | | | | | | | Livestock number at the beginning of the year 1998 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Increment | | | | Decrement | | | | | |
| | | New born | Gift from other | Purchase | Total increment | death | Gift to others | slaughtered | sales | Total decrement | |
| 1.cattle | | | | | | | | | | | |
| a .cows | | | | | | | | | | | |
| b .calves | | | | | | | | | | | |
| c. heifers | | | | | | | | | | | |
| d. bull, steers, ox | | | | | | | | | | | |
| Sub total | | | | | | | | | | | |
| 2. shoat | | | | | | | | | | | |
| a. goat | | | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| b.sheep | | | | | | | | | | | |
| Sub total | | | | | | | | | | | |
| 3.camel | | | | | | | | | | | |
| 4.equines | | | | | | | | | | | |
| a.donkey | | | | | | | | | | | |
| b.horse | | | | | | | | | | | |
| c.mule | | | | | | | | | | | |
| Sub total | | | | | | | | | | | |
| Total | | | | | | | | | | | |
| 5.poultry | | | | | | | | | | | |
| Grand total | | | | | | | | | | | |

**3 Farm resource characteristics**

3.1 Do you have your own land? 1. Yes 0. No

3.2 If yes, How many hector of land do you have?

Cultivated----------(in timad/ hector)

Grazing ----------(in timad/ hector)

**4. Institution and social factors**

4.1 Do you get extension service 1. Yes 0. No

4.2 If yes, How many days contact with DA،s?----------(in month)

4.3 Have you participated in training of livelihood strategy, IGA? 1. Yes 0. No

4.4 If yes, How many days obtained training/advice?----------

4.5 Do you get/participate access of credit? 1. Yes 0. No

4.6 Did you get remittance/from abroad? 1. Yes 0. No

4.7 Do you participate in cooperatives? 1. Yes 0. No

**5. Livelihood strategy**

5.1 Which of the following activities are major sources of livelihood?

0. Agriculture only (crop production and livestock rearing)

1. Agriculture + off –farm activity(daily labor work(wage), renting of asset(land, ox), fire wood sale and trading of livestock) + Non-farm activity(hand craft, small business trade and remittance/from abroad)

5.2 If your answer to question # 5.1 is 1(yes),which of the following activities are practiced?

| Commonly practiced off+non farm activities | 1.yes | 0.No |
|---|---|---|
| daily labor work(wage) | | |
| renting of asset(land, ox) | | |
| fire wood sale and trading of livestock) | | |
| hand craft | | |
| small business trade | | |
| remittance/from abroad | | |
| | | |
| | | |
| Other specify | | |

5.3 What is your major driving force to diversify? Rank this driving force on the basis of your priority (rank the first (1) to be the most)

| Commonly identified driving forces | Rank |
|---|---|
| Land in productivity | |
| Less land holding size | |
| Food insecurity | |
| Less income | |
| un sustainable use of natural resources | |
| Other, specify | |

## Discussion points with the expert

1. What is the livelihood of the households?

- What is the source of their food
- What is the source of their income?

2. What do you know about the extent of livelihood diversification in the area?

3. Is it changing? How? Why it is changing? What are the possible sourcesfor change in the livelihood of the household in Dabat?

4. What is the impact of institutions in the livelihood of the household?

5. What are the major driving forces to engage in livelihood diversification?

## 7.2 Appendix II:

**Appendix Table 1: Conversion Factors to Estimate Tropical Livestock Unit equivalents**

| Livestock type | TLU | Livestock type | TLU |
|---|---|---|---|
| Calf | 0.2 | Sheep | 0.1 |
| Heife | 0.5 | Donkey | 0.4 |
| Cow | 0.8 | Horse | 0.8 |
| Bull, Ox | 1.1 | Mule | 0.7 |
| Goat | 0.1 | | |

Source: Storck, et at. (1991)